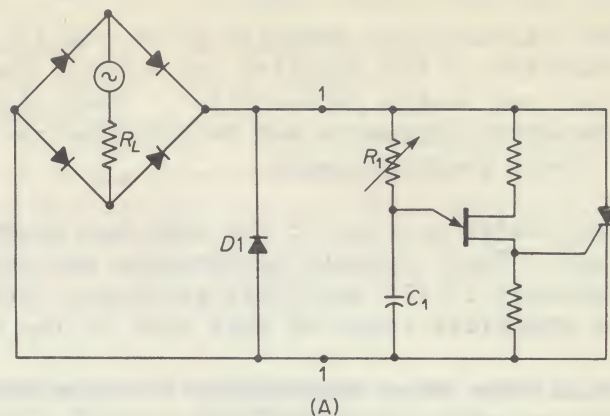


NOW you can clearly understand
and easily design circuits --

AND, come up with the
specific performance
attributes you want.



WITH A MINIMUM OF TIME AND EFFORT SPENT,
YOU CAN OBTAIN A THOROUGH, WORKING KNOW-
LEDGE OF A WIDE RANGE OF TRANSISTOR CIRCUITS...

at home...in your spare moments...with

TRANSISTOR CIRCUIT ANALYSIS AND DESIGN

by JOHN J. CORNING

448 pp., 317 illus., 6x9" (Sept. 1965)

NOW, you can quickly and easily learn the principles of circuit analysis. Even more important, you will see how to apply these principles to design circuits with the specific performance attributes you want.

A WEALTH OF TRANSISTOR INFORMATION CAN BE YOURS.

You get discussions of a broad scope of circuits in detail -- d-c bias techniques, a-c equivalent circuits, small and large signal amplifiers, frequency effects, high frequency amplifiers, oscillators, pulse circuits and power supplies.

You see how to utilize many semiconductor types -- unijunction transistors, tunnel diodes, rectifiers and silicon controlled rectifiers.

REMAINS TIMELY FOR YEARS...

Transistor Circuit Analysis and Design will remain useful and up-to-date for years to come. It's broad base of technical material will cope with "state of the art" semiconductor technology and circuit design requirements for many years. In treating oscillators and pulse circuits, unijunction devices and tunnel diodes are discussed extensively and supplement the conventional content of feedback oscillators and two transistor arrays. The same philosophy is maintained in treating controlled rectifiers in power control circuitry.

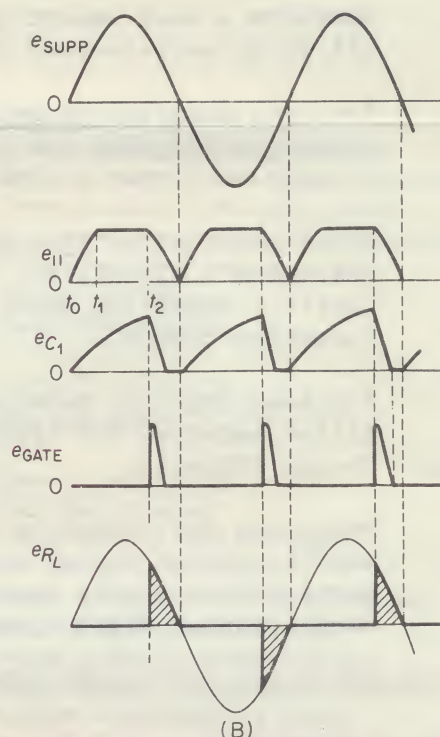


Fig. 15.27 (A) A-C phase-control circuit using a silicon-control rectifier. (B) Pertinent circuit waveforms.

USEFUL SELF-STUDY AIDS...

Many illustrative examples guide you to thorough understanding of all topics and insure retention of the material you cover. These examples demonstrate the application of analytical and design philosophies. They also serve as ready reference and refresher media from which engineers and technicians can extrapolate solutions to problems they encounter in their every-day work.

Every major section of the book has examples. Each example involves real life considerations. Thus, dynamic performance and degree of d-c bias stability are considered simultaneously in all amplifier problems. This is but one of many situations which illustrate the practical value of this book to the working engineer.

Check these many outstanding features which will make this book a valuable addition to your personal, technical library:

Contains a vast amount of analytical and design data -- all in an easy-to-read and easy-to-understand style.

Presents material on R-C circuits, cascade stages, and frequency response not presented elsewhere in such breadth or with so direct a link to real-case circuit design.

Gives material on bias networks which is truly useful for designing a circuit for any given operating point with specific operating point controls in case of transistor parameter change.

Provides complete material on power supplies. Explains filter networks and regulated supplies and gives meaningful design criteria.

Discusses very complete graphical techniques as a tool for handling large signal amplifier design. These techniques supplement key math equations to any large signal amplifier requirement - Class A single ended or Class AB push-pull.

PLUS, with the aid of this book, you will be able to:

1. Understand current directions and junction phenomena in diodes and transistors.
2. Develop the ability to design circuits to achieve any desired operating point and stability.

TECHNICIANS -- Here's the easy way to acquire competence in understanding transistor circuitry. In your spare time, you can read this most complete single volume from which a thorough grasp of transistor knowledge can be obtained. What's more - you need only a background in algebra and basic electrical circuits.

ENGINEERS -- You see how to reconstruct the salient features of a broad scope of circuits designs: amplifiers, oscillators, and biasing networks. The informative, factual content and the availability of so many illustrative examples, provide a meaningful step-by-step refresher as well.

AUTHORITATIVE GUIDANCE ASSURES UNDERSTANDING...

The author, JOHN J. CORNING, is currently Manager of Monolithic Circuit Packaging Engineering at International Business Machines Corporation. Mr. Corning has developed a knack for explaining transistors, applications and design details so they come through

crystal clear. He has taught transistor courses to professional people at the General Electric Co. and has also taught at Mohawk Valley Community College, Utica, New York for five years.

But, you must see this book to appreciate it. You must at least leaf through it to see how easy it can be for you to obtain a valuable, working knowledge of transistors.

If you are not completely satisfied with the complete coverage of all phases of transistor applications and design factors, with the easy-to-read and understand style, with the many illustrative examples which insure retention of all material -- simply return the book and owe nothing. ABSOLUTELY NO OBLIGATION TO BUY.

Send the enclosed card today. Don't delay. A knowledge of transistors could mean a step up for you. Do it the easy way - send for Corning's Transistor Circuit Analysis and Design TODAY.

TABLE OF CONTENTS

1 Semiconductor materials

- 1.1 Review of electron theory
- 1.2 Conductors and insulators
- 1.3 Intrinsic semiconductors
- 1.4 N-type semiconductors
- 1.5 P-type semiconductors

2 Junction phenomena

- 2.1 The basic PN junction
- 2.2 Equilibrium junction currents
- 2.3 The reversed bias junction
- 2.4 The forward bias junction
- 2.5 The PN junction as a rectifier
- 2.6 Voltage breakdown
- 2.7 Equivalent circuit of a diode

3 Fundamentals of transistor action

- 3.1 Proximate independent junctions
- 3.2 Phenomena of interacting junctions
- 3.3 NPN and PNP comparisons
- 3.4 The transistor as an active device
- 3.5 Transistor connections

4 Attributes of the real transistor

- 4.1 Common-base leakage currents
- 4.2 Common-base breakdown voltage
- 4.3 Common-emitter leakage currents
- 4.4 Common-emitter breakdown voltages
- 4.5 Summary

5 Transistor static characteristics

- 5.1 Static characteristics
- 5.2 Common-base input characteristic
- 5.3 Common-base reverse-voltage characteristic
- 5.4 Common-base output characteristic

- 5.5 Common-base forward-current characteristic
- 5.6 Common-emitter input characteristic
- 5.7 Common-emitter reverse-voltage characteristic
- 5.8 Common-emitter output characteristic
- 5.9 Common-emitter forward-current characteristic
- 5.10 Common-collector comments
- 5.11 Temperature effects
- 5.12 Special characteristics

6 D-C bias techniques

- 6.1 General considerations
- 6.2 Fixed-bias technique
- 6.3 Design example: fixed-bias circuit
- 6.4 Current Feedback Principles
- 6.5 Design example: current-feedback biasing
- 6.6 Basic voltage feedback principle
- 6.7 Voltage feedback—detailed analysis
- 6.8 Design example: voltage-feedback biasing
- 6.9 Modified voltage-feedback biasing
- 6.10 Design example: modified voltage-feedback biasing
- 6.11 Combination current-voltage-feedback detailed analysis
- 6.12 Design example: combination current-voltage feedback biasing
- 6.13 Modified current-voltage feedback biasing
- 6.14 Design example: modified combination current-voltage feedback
- 6.15 Nonlinear compensation techniques

7 Transistor a-c equivalent circuits

- 7.1 Equivalent circuit possibilities
- 7.2 Developing the h -parameters
- 7.3 The r -equivalent circuit
- 7.4 h - r parameter interrelations
- 7.5 h -parameter relations for each transistor connection
- 7.6 Sample of h -parameter calculation
- 7.7 Effects of operating point
- 7.8 Modified h -parameters
- 7.9 Example: h -parameter modification by a single element
- 7.10 h -parameter modification due to several elements

- 7.11 Normalizing h -parameter modifications
- 7.12 Design example to obtain specific modified h 's
- 7.13 Summary

8 Properties of low-frequency amplifiers

- 8.1 General-case situation
- 8.2 Comparison of the possible connections
- 8.3 Further discussion of power gain
- 8.4 Example: calculating circuit performance
- 8.5 Circuit design using emitter by-pass capacitance

9 Low-frequency cascade amplifiers

- 9.1 General-case analysis procedures
- 9.2 Transformer coupling
- 9.3 RC -coupled circuits—iterative case
- 9.4 RC -coupled circuits—general-case analysis
- 9.5 Design example: RC -coupled amplifier
- 9.6 RC -coupled circuit using current-feedback biasing
- 9.7 Design example: RC -coupled amplifier using current-feedback bias
- 9.8 Cascading RC -coupled stages

10 Frequency effects in audio amplifiers

- 10.1 General-case frequency-dependent circuits
- 10.2 Specific analysis transistors at low frequency
- 10.3 Example: coupling capacitor effects on performance
- 10.4 Example: by-pass capacitor effects on performance
- 10.5 Specific analysis—transistors at high frequency
- 10.6 Example: transistor parameters at high frequency
- 10.7 Frequency response of multistage amplifier
- 10.8 Example: performance of multistage circuit
- 10.9 Basic principles of controlling frequency response
- 10.10 Specifics of negative-feedback circuits
- 10.11 Tone-control circuits—bass boost
- 10.12 Design example for bass-boost tone control
- 10.13 Tone-control circuits—treble boost
- 10.14 Design example: treble-boost tone control
- 10.15 Combined bass-treble control using feedback
- 10.16 Design example: combination control using feedback
- 10.17 Tone control with coupling circuitry
- 10.18 Design example: coupling-circuitry tone control
- 10.19 Summary

11 Low-frequency large-signal amplifiers

- 11.1 Large-signal amplifiers basic considerations
- 11.2 Transistor considerations for power-amplifier use
- 11.3 Direct-coupled Class A
- 11.4 Example: direct-coupled Class A circuit
- 11.5 Transformer-coupled Class A
- 11.6 Example: transformer-coupled Class A circuit
- 11.7 Class A RC -coupled
- 11.8 Distortion in Class A amplifiers
- 11.9 Class B push-pull amplifier theory
- 11.10 Class AB push-pull theory
- 11.11 Biasing the Class AB stage
- 11.12 Input considerations—Class AB circuits
- 11.13 Design example for Class AB
- 11.14 Distortion in Class AB amplifiers
- 11.15 Special audio circuits
- 11.16 Summary

12 High-frequency amplifier applications

- 12.1 Transistor behavior at high frequencies
- 12.2 General considerations—High-frequency amplifiers
- 12.3 Example: high-frequency performance calculations
- 12.4 Narrow-band amplifiers
- 12.5 Narrow-band design problem
- 12.6 Tuned-amplifier applications
- 12.7 Wide-band amplifiers
- 12.8 Review of high-frequency transistors

13 Oscillator principles and circuits

- 13.1 Basic-oscillator principles
- 13.2 Feedback oscillators
- 13.3 Tunnel-diode theory
- 13.4 Tunnel-diode sinusoidal oscillators
- 13.5 Example: tunnel-diode sinusoidal oscillator
- 13.6 Unijunction transistor theory
- 13.7 Unijunction transistor relaxation oscillators
- 13.8 Example: unijunction relaxation oscillator performance
- 13.9 Tunnel-diode relaxation oscillator
- 13.10 Example: tunnel-diode relaxation oscillator
- 13.11 Astable multivibrators
- 13.12 Summary

14 Pulse circuits

- 14.1 Monostable multivibrators
- 14.2 Monostable tunnel-diode circuits
- 14.3 Bistable multivibrators
- 14.4 Counting circuits
- 14.5 Tunnel-diode counters
- 14.6 Logic-circuit fundamentals
- 14.7 Summary

15 Power supply and control circuits

- 15.1 Basic power-supply considerations
- 15.2 Full-wave rectifier circuit
- 15.3 Example: full-wave rectifier
- 15.4 Bridge-rectifier circuit
- 15.5 Capacitor input filter
- 15.6 Capacitor input filter example
- 15.7 Voltage doubler circuit
- 15.8 Inductor input filters
- 15.9 Choke input filter example
- 15.10 Regulated power supplies
- 15.11 Regulated-supply example
- 15.12 Controlled-rectifier theory
- 15.13 D-C switching application for controlled rectifier
- 15.14 A-C phase-control application for controlled rectifier
- 15.15 Summary

16 Laboratory experiments

- 16.1 Diode characteristics and applications
- 16.2 Transistor characteristics
- 16.3 D-C bias circuits

PRENTICE-HALL
ENGLEWOOD CLIFFS, N. J.

DEGB